This invention relates to improvements in resetting mechanism for weft replenishing looms and it is the general object of the invention to cancel an initiated replenishing operation when the loom stops because of weft failure.

In the usual weft replenishing loom there will be some part which is moved from its normal position to an abnormal or indicating position when the weft detector initiates or calls for a replenishing operation by indicating exhaustion of weft in the weaving shuttle. When this part, which may be termed a controller, is in its abnormal or indicating position replenishment by an automatic action of the loom, or at least an attempt at replenishment, will be a necessary result of continued loom operation.

If the filling breaks or becomes exhausted in the interval between indication of weft exhaustion by the detector and a replenishing operation the loom will stop with the controller in indicating position. Under these conditions it is common practice for the weaver to remove the broken pick of filling and also place a fresh supply of weft in the shuttle, thereby making an automatic replenishment not only unnecessary but undesirable. Upon resumption of weaving, however, the controller which is still being in indicating position will cause an automatic replenishment of weft and the fresh supply placed into the shuttle manually by the weaver will be discarded. The supply of weft thus discarded may be injured by its contact with the bobbin can if the loom be the bobbin changing type, but in any event it must again be handled before it can enter into active weaving.

It is an important object of my present invention to prevent the discarding of the manually replenished weft by cancelling an initiated transfer should the loom be stopped by the weft fork while the controller is in indicating position. The control for accomplishing this result is derived from the weft stop motion and acts to return the controller to its normal non-indicating position whenever the loom is stopped by weft failure. In this way the automatic replenishment is cancelled and the manually replenished weft remains in action.

The general features of my invention are applicable to bobbin changing and shuttle changing looms alike and I do not wish to be limited in the use of my invention to bobbin changing looms. As a matter of convenience I have shown the invention applied to a bobbin changing loom having a controller of the type extensively used in shuttle changing looms of the kind illustrated for example in Patents Nos. 2,054,174 and 2,054,192.

The condition already described will exist in a loom operating with a single type of weft as well as in those looms which weave different types of weft. I have illustrated my invention in connection with a multicolor weft replenishing loom, but certain features of my invention are not limited to looms of this type, inasmuch as the steps of indicating weft exhaustion, initiating a replenishing operation by movement of the controller to indicating position, and weft breakage with subsequent cancellation of the replenishing operation can all occur during the weaving of a block of single color in the pattern of the fabric being woven.

Weft stop motions are customarily of two types one of which employs a slide located at one side of the cloth and carrying a fork to detect the weft extending from the selvage into the shuttle box every other loom beat, while the other type employs a fork mounted on the lay and located between the selvages to detect the presence or absence of weft on each beat of the loom. I have shown my invention in connection with the latter type of stop motion, called commonly the center filling stop motion, but I do not wish necessarily to be limited to a weft stop motion of that type. It is sufficient if the stopping movement of some part of the weft stop motion is communicated to the resetter for the aforesaid controller.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described.

In the accompanying drawings, wherein a convenient embodiment of my invention is set forth:

Fig. 1 is an end elevation of a weft replenishing loom having my invention applied thereto, parts being in section,

Fig. 2 is a plan view of a part of the loom taken in the direction of arrow 2, Fig. 1, parts being in section,

Fig. 3 is a vertical section on an enlarged scale on line 3—3 Fig. 1, showing the indication storing controllers which are reset by operation of my present invention,

Fig. 4 is a detailed view on an enlarged scale of a part of the structure shown near the center of Fig. 1, parts being in section,

Fig. 5 is a vertical section on an enlarged scale on line 5—5 of Fig. 2, and

Fig. 6 is a perspective view of a part of the weft stop motion mounted on the loom breast beam and looking forwardly from the lay.

Referring particularly to Fig. 1, I have shown a loom frame 10 having a lay 11 mounted on a sword 12 supported by and turning the proctor shaft 13 near the bottom of the loom. A connector 14 extends rearwardly from the lay and is connected to wrist pin 15 on the top shaft 16 which makes a revolution every pick of the loom.
The loom operates with two weaving shuttles one of which is shown at 5 and the lay has two shift - ing shuttle boxes not shown at the end of the lay opposite as shown in Fig. 1. The shuttle 5 carries a bobbin B to cooperate with a weft detector D located at the magazine side of the loom and acting electrically in the present instance to energize a solenoid E when the weft on the bobbin B is exhausted and the active shuttle is on the replenishing side of the loom. Energization of the solenoid may be effected by means of a source of electric power P which is connected to the detector by wire 18 and to the solenoid by wire 19, while the detector is connected to the solenoid by wire 20. When weft exhaustion occurs in the shuttle the electric circuit indicated in Fig. 1 will be closed to lift the core 21 of the solenoid and thereby elevate a lifting arm 22, see Fig. 3. A carriage 25 is slidably mounted on fixed pins 26 and is provided with two controller fingers 27 and 28, respectively, connected to yielding positioning elements 29 which in the present instance may be spring plungers carried by the carriage. Each controller finger carries a trip 30 adapted for cooperation at one at a time with the trip 30 of the lifting arm 22. The position of the trips with respect to the lifting arm is determined by the mechanism shown at the bottom of Fig. 1, where a cable 31 is attached to the lower end of an indicator lever 32 pivot ed about a fixed axis 33. The cable 31 extends to the other side of the loom and is attached by connections not shown either to the drop boxes or some part moving in timed relation with them. The cable therefore acts to rock the lever 32 in a counterclockwise direction when the cable is slackened. A connector rod 35 extends from the lever 32 to the carriage 25 and is means by which the latter slides in response to shifting of the shuttle boxes to place one or the other of the trips 30 over the lifter arm 22. Energization of the solenoid will therefore cause the lifter arm to engage the trip of the controller finger corresponding to the active exhausted shuttle.

A cam 31 rotating once every two picks of the loom rocks a lever 33 swinging about a fixed pivot 34 and a lifter dog 40 pivoted to the forward, or left end of lever 38 as viewed in Fig. 1, is adapted for engagement with a normally stationary operating lever 41. The latter is connected by rod 42 to transfer latch 43 and shuttle feeder 44. The latch 43 is connected to the usual transferrer arm 45, while the shuttle feeder is carried by supporting arm 46 and is swung rearwardly, or to the right as viewed in Fig. 1, when a transfer is about to occur.

A magazine designated generally at M supplies two different types of bobbins or weft carriers W and W' corresponding to the two weaving shuttles mentioned. The magazine is rocked by the connections indicated in Fig. 1 so that the reserve bobbin under the transferrer arm corresponds to the active shuttle. Each shuttle will remain active for two picks or a multiple thereof and the alternation of activity on the part of the shuttles is controlled by a pattern mechanism not shown at a time when it is accompanied by a shifting of the carriage 25.

The loom has a shipper handle 50 to operate a lever 51 attached to a rearwardly extending rod 52 which operates the shipping mechanism not shown for the loom. This mechanism is well understood, left hand motion of the shipper handle as viewed in Fig. 1 corresponding to a forward pull of rod 52 to cause the loom to operate. The shipper handle is mounted on shipper rod 53 and rocking of the latter in a right hand direction as viewed in Fig. 1 from normal running position will effect loom stoppage.

It is not deemed necessary to give a full description of the operation of the replenishing mechanism or the shipper control since these parts are already known and are shown for instance in my prior Patent No. 2,128,974. It is thought sufficient for present purposes to state that both the controller fingers illustrated particularly in Fig. 3 will be normally in the down position occupied by finger 28 of that figure and that when indication of weft exhaustion is given by the detector the lifter arm 22 will raise the controller finger corresponding to the active shuttle to the position occupied by finger 27 in Fig. 3. Furthermore, the controllers are movable toward and from active position relatively to the lifter arm 22 by rocking of lever 32 in response to shifting of the drop boxes. The details of the operation of the controllers are forth and described in the aforementioned Patent No. 2,054,192. When either of the controller fingers 27 or 28 is raised a replenishing operation has been initiated and when the exhausted shuttle again moves toward the magazine end of the loom the controller finger corresponding thereto will be in a position to direct the lifting dog 40 into lifting relationship with respect to lever 41, see Fig. 3, whereupon the latch 43 will be set for transfer and the shuttle feeder 44 placed for detecting the position of the shuttle along the lay.

As already stated the present invention relates to means to reset the fingers 27 and 28, and more generally the indication storing mechanism of a weft replenishing loom, when the weft stop motion stops the loom due to failure of weft. It is well known that the various types of filling stop motions employed at the present time include in their construction a part which is moved upon weft failure to effect loom stopping. In the present instance I have elected to illustrate my invention in connection with a center stop motion of the type employed on silk looms, but I do not wish to be limited in the practice of my invention to this particular kind of weft stop motion.

In the application of my invention of the structure already described it is convenient to use certain parts which are shown in my co-pending application Serial No. 225,607. Since the structure shown in that application is used with my present invention I prefer to illustrate the transferrer arm which is the subject matter of the co-pending application, since it provides the normal means for resetting the controllers after a transfer. I wish it to be understood however that the present invention can operate independently of the structure shown in the co-pending application.

As a convenient mounting for certain parts to be described I use a lever 50 pivoted to the loom frame at 51 and having a roll 52 for cooperation with an inclined plate 53 which moves with the transferrer arm 45. The lever 50 is normally held raised by a light spring 54 and is depressed when the transferrer arm is lowered. This last feature is not essential in my present invention, but I do employ a depending rod 100 pivoted to
the lever 90 at 101 and having a turn-buckle 102 as set forth in the co-pending application to re-set the active controller 27 or 28 at the time of a normal transfer. A tube 103 depends from the turn-buckle and has a stop collar 104 for engagement with the under side of a guide 105 through which the tube extends. The part of the tube is made tubular herein for a purpose to be set forth but it can be considered as a continuation of rod 100 for the resetting purposes just described and it is to be understood that the tube 103 will be held normally in its raised position shown in Fig. 1 at all times except during a transferring operation of the loom.

15. In carrying my invention into effect I provide mechanism which will cause a resetting of an active controller finger in indicating position corresponding to an active shuttle the thread of which breaks or becomes exhausted during weaving with resultant loom stoppage through the weft stop motion. In this way the weaver can replenish the shuttle by hand without danger of a repeated automatic replenishment to be effected by the loom after weaving is resumed.

20. The wire 24 extends downwardly inside the tube 03 and is attached to a plunger head 26 normally though not necessarily located within the tube as shown in the lower part of Fig. 4. Adjustment of the wire 124 with respect to the guide 125 is obtained at the weft stop motion by making the head 120 in two adjustable parts as shown in Fig. 5.

25. Under normal conditions with the thread intact during weaving the dagger 118 will be depressed to the dotted position of Fig. 5 and will pass under the notch 117 during the forward 10 beat of the lay. When the filling breaks, however, the dagger will remain raised in a manner customary to center stop motions and will engage the dog 116 to move it forwardly or to the left as viewed in Fig. 5 to cause rocking of 15 shafts 114 and 53 to stop the loom. The center stop motion therefore performs its primary function of stopping the loom when the weft breaks, but when the dog moves forwardly the wire 124 is caused to slide through the flexible guide 125 with the result that the plunger head 123 is projected downwardly from its normal position or to the dotted lines indicated in Fig. 4. If at this time the finger or controller in active position immediately under the plunger 126 has previously been raised by indication it will be depressed by the plunger and the replenishing mechanism will thereby be reset to normal condition, thus cancelling the transfer and preventing an automatic replenishment.

30. When the loom is stopped the weaver will correct the mispick caused by the broken or exhausted filling and will replenish the shuttle by hand, as is customary. Upon resumption of weaving therefore there will be no coupling of levers 38 and 41 by dog 40 and the fresh hand replenished weft in the shuttle will remain in action. It is to be understood that the controller 27 or 28 which is depressed by the plunger 126 corresponds to the active shuttle and the filling stop motion does not act to reset a controller finger in indicating position but moved out of active position because its corresponding exhausted shuttle is temporarily idle.

35. It will be understood that projection of the plunger 162 is independent of motion on the part of tube 103 and can and ordinarily will occur when the latter is stationary. If the brake of the loom is loose so that the weaver can reach front center position before stopping a transfer will occur and tube 103 will descend as well as plunger 123. The weaver however will notice that automatic replenishment has already taken place and that it is unnecessary to replenish the shuttle by hand.

40. From the foregoing it will be seen that I have provided mechanism for resetting whichever of the controllers 27 and 28 happen to be in active indicating position when the loom is stopped through the weft stop motion. It will be noted also that the tube 103 which is depressed by action of the transfer arm to reset the controller fingers under normal transfer conditions is also a carrier for the resetting device controlled by the weft stop motion. Furthermore, while I have illustrated my invention in connection with a so-called center stop motion, I do not necessarily wish to be limited to motions of this type, inasmuch as other forms of filling stop motions have a part which is moved to effect loom stoppage to which the wire 124 could be attached. Again, the invention is useful on looms operating with one or more weaving shuttles and is also applicable to shuttle changing looms which employ
the controllers 21 and 28 or parts similar to them.

Having thus described my invention it will be seen that changes and modifications may be
done therein by those skilled in the art without departing from the spirit and scope of the
invention and I do not wish to be limited to the
details herein disclosed, but what I claim is:

1. In a weft replenishing loom having a re-
serving bobbin to be transferred into a weav-
ing shuttle, transfer mechanism effective when set
for transfer to move the reserve bobbin into the
weaving shuttle during a replenishing operation,
means to initiate a replenishing operation of the
loom upon occurrence of weft exhaustion in the
weaving shuttle, a controller to be moved from
normal to indicating position by the initiating
means, an actuator having an operating stroke
at two-pick intervals during the loom opera-
tion, controlled by the controller when the latter is in indicating position to couple
the actuator to the transfer mechanism and set
the latter for transfer, means to hold the con-
troller in indicating position after the transfer
mechanism is set for transfer, a weft stop motion
to stop the loom upon weft run in the
weaving shuttle occurring subsequent to
movement of the controller to indicating posi-
tion and prior to operation of the coupling
means, and connections between the filling stop
motion and the controller to require the latter
to move into normal position ineffective to couple
the actuator with the transfer mechanism when
the loom is stopped by failure of the weft.

2. In a multicolor weft replenishing loom hav-
ing two reserve bobbins and operating with two
weaving shuttles each of which may become ac-
tive, transfer mechanism effective upon a com-
plete operation thereof to insert either of the
reserve bobbins into the weaving shuttle corre-
sponding thereto, a pair of controllers for the
transfer mechanism, one for each weaving shut-
tle, and each controller movable from normal
to indicating position upon exhaustion of weft in
the active shuttle corresponding thereto,
means to move each controller into and out of
active position, the controller in active posi-
tion corresponding to the active shuttle, means
controlled by the controller when in indicating
position and also in active position to set the
transfer mechanism replenishing the loom at a given point in each
two-pick cycle of the loom for a transferring op-
eration, means to hold the controller in indi-
cating position after the transfer mechanism is
set for transfer, a weft stop motion operating to
stop the loom upon failure of the weft thread of
either shuttle means effective to stop the
weaving mechanism, and resetting means
operated by the weft stop motion and acting to
move the controller in active position and corre-
sponding to the active depleted weaving shuttle
from indicating to normal position when the weft
stop motion operates to stop the loom.

3. In a multicolor weft replenishing loom oper-
ating with two weav ing weft supplies either
of which may become active, weft replenishing
mechanism to supply reserve wefts correspond-
ing to the weaving weft supplies, a pair of con-
trollers for the weft replenishing mechanism each
operated from normal to indicating position upon
occurrence of weft exhaustion in the active weav-
ing weft supply corresponding thereto, means to
move each controller into and out of active posi-
tion, the controller in active position correspond-
ing to the active weft supply, means controlled
by either controller when in active and indicat-
ing position to set the replenishing mechanism
for a transferring operation which replaces
the active depleted weaving weft supply with a re-
serve weft supply corresponding thereto, means
to hold the controller in indicating position after
the transfer mechanism is set for transfer, a weft
stop motion to stop the loom upon failure of the
weft of either of the weaving weft supplies, and
resetting means for the controller in active posi-
tion operated by the weft stop motion when the
latter stops the loom to return a controller in
the active and also in indicating position to nor-
mal position to prevent operation of the weft re-
plenishing mechanism.

4. In a multicolor weft replenishing loom oper-
ating with two weaving shuttles either of which
may become active, multicolor weft replenishing
mechanism to supply two types of reserve weft,
one type for each weaving shuttle, setting means
movable from normal to indicating position to
set the replenishing mechanism for a replenish-
ing operation with respect to the reserve weft
effective to a maximum of the thread in the
loom, and means controlled by the controller when
in indicating position to complete the replenish-
ning operation of the replenishing mechanism,
means to hold the setting means in indicating posi-
tion after the replenishing mechanism is set for
a replenishing operation, a weft stop motion to
stop the loom upon failure of the weft of either
weaving shuttle when active occurring between
the times of operations of the setting means and
said subsequently acting means, and means
controlled by the weft stop motion to return
the setting means to normal position and prevent
operation of the subsequently acting means when the weft stop motion stops the loom.

5. In a multicolor weft replenishing loom oper-
ating with a pair of weaving shuttles either of which
may become active, multicolor weft replenish-
ing mechanism to supply reserve wefts corre-
sponding to the weft supplies of the weav-
ing shuttles, a controller for the weft replenish-
ing mechanism corresponding to each weaving
shuttle, means to move the controller into and
out of active position, the controller in active
position corresponding to the active shuttle,
means operative upon exhaustion of weft in
the active shuttle to move the controller corres-
sponding thereto in active position from normal to
indicating position, a controller in indicating posi-
tion capable of moving out of active position
when the weaving shuttle corresponding thereto
becomes inactive, means controlled by a con-
troller in indicating and also active position to set
the replenishing mechanism for a replenishing
operation, means to hold the controller in indi-
cating position after the transfer mechanism is
set for transfer, a weft stop motion to stop the
loom upon failure of weft in either weaving
shuttle when active, and means operated by the
weft stop motion when the latter stops the loom
to return the controller in indicating position and
in the active position only from indicating to weft
replenishing mechanism, means to prevent
operation of the weft replenishing mechanism.

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